

ABSTRACT OF THE DISCLOSURE

An apparatus for atomic layer deposition preventing mixing of a precursor gas and an input gas. From the apparatus a flow of the input gas is provided over a surface of the workpiece wherein a beam of the electromagnetic radiation is directed into the input gas in close proximity to the surface of the workpiece, but spaced a finite distance therefrom. The input gas is dissociated by the beam producing a high flux point of use generated reactive gas species that reacts with a surface reactant formed on the surface of the workpiece by a direct flow of the precursor gas flown from the dispensing unit. The surface reactant and reactive gas species react to form a desired monolayer of a material on the surface of the workpiece.